

5-4

Study Guide and Intervention

Writing Equations in Slope-Intercept Form

Write an Equation Given the Slope and One Point

Example 1

Write an equation of a line that passes through $(-4, 2)$ with slope 3.

The line has slope 3. To find the y -intercept, replace m with 3 and (x, y) with $(-4, 2)$ in the slope-intercept form. Then solve for b .

$$y = mx + b$$

Slope-intercept form

$$2 = 3(-4) + b$$

 $m = 3$, $y = 2$, and $x = -4$

$$2 = -12 + b$$

Multiply.

$$14 = b$$

Add 12 to each side.

Therefore, the equation is $y = 3x + 14$.

Example 2

Write an equation of the line that passes through $(-2, -1)$ with slope $\frac{1}{4}$.

The line has slope $\frac{1}{4}$. Replace m with $\frac{1}{4}$ and (x, y) with $(-2, -1)$ in the slope-intercept form.

$$y = mx + b$$

Slope-intercept form

$$-1 = \frac{1}{4}(-2) + b$$

 $m = \frac{1}{4}$, $y = -1$, and $x = -2$

$$-1 = -\frac{1}{2} + b$$

Multiply.

$$-\frac{1}{2} = b$$

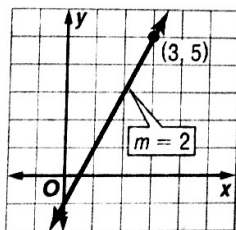
Add $\frac{1}{2}$ to each side.

Therefore, the equation is $y = \frac{1}{4}x - \frac{1}{2}$.

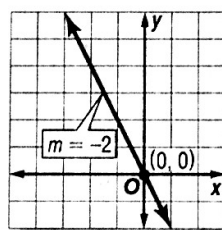
Exercises

Write an equation of the line that passes through each point with the given slope.

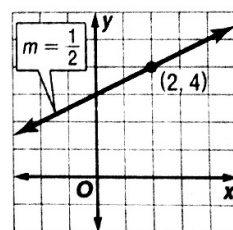
1.



2.



3.



4. $(8, 2)$, $m = -\frac{3}{4}$

5. $(-1, -3)$, $m = 5$

6. $(4, -5)$, $m = -\frac{1}{2}$

7. $(-5, 4)$, $m = 0$

8. $(2, 2)$, $m = \frac{1}{2}$

9. $(1, -4)$, $m = -6$

10. Write an equation of a line that passes through the y -intercept -3 with slope 2.

11. Write an equation of a line that passes through the x -intercept 4 with slope -3 .

12. Write an equation of a line that passes through the point $(0, 350)$ with slope $\frac{1}{5}$.

5-4 Study Guide and Intervention *(continued)*

Writing Equations in Slope-Intercept Form

Write an Equation Given Two Points

Example

Write an equation of the line that passes through (1, 2) and (3, -2).

Find the slope m . To find the y -intercept, replace m with its computed value and (x, y) with (1, 2) in the slope-intercept form. Then solve for b .

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Slope formula

$$m = \frac{-2 - 2}{3 - 1}$$

$$y_2 = -2, y_1 = 2, x_2 = 3, x_1 = 1$$

$$m = -2$$

Simplify.

$$y = mx + b$$

Slope-intercept form

$$2 = -2(1) + b$$

Replace m with -2 , y with 2 , and x with 1 .

$$2 = -2 + b$$

Multiply.

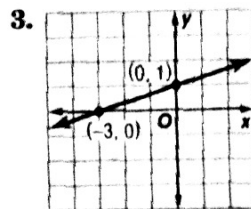
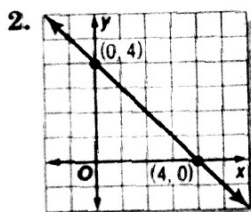
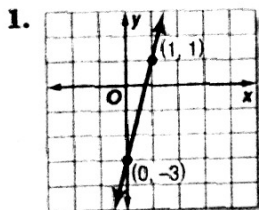
$$4 = b$$

Add 2 to each side.

Therefore, the equation is $y = -2x + 4$.

Exercises

Write an equation of the line that passes through each pair of points.



4. $(-1, 6), (7, -10)$

5. $(0, 2), (1, 7)$

6. $(6, -25), (-1, 3)$

7. $(-2, -1), (2, 11)$

8. $(10, -1), (4, 2)$

9. $(-14, -2), (7, 7)$

10. Write an equation of a line that passes through the x -intercept 4 and y -intercept -2 .

11. Write an equation of a line that passes through the x -intercept -3 and y -intercept 5.

12. Write an equation of a line that passes through $(0, 16)$ and $(-10, 0)$.